

Appl. No. 10/707,711

Docket No. 140021 / GEM-0094

**AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions and listings of claims in the application.

**Listing of Claims:**

1. (currently amended)      A magnetic field generator for producing a homogenous magnetic field region within a field of view, and being operable via electronics, the magnetic field generator comprising:
  - a plurality of main magnet coils arranged in a cylindrical fashion and disposed within a magnet housing;
  - a plurality of shielding coils arranged in a cylindrical fashion, and located radially outward of the plurality of magnets and within the magnet housing; and
  - control electronics disposed within an electronics housing, the electronics housing being disposed outward of and proximal to the magnet housing;wherein the main magnet coils and shielding coils are configured to shape a magnetic field which comprises at least one low fringe field region when in operation, the at least one low fringe field region being at a location less than 2.5 meters radially from the center of the field of view and having a magnetic field strength low enough so as to not harm the electronics, the at least one low fringe field region including a region wherein the control electronics are located.

2. (original)      The magnetic field generator of claim 1 further comprising negative coils to help shape magnetic field in the imaging volume.

3. (canceled)

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4. (currently amended) The magnetic field generator of claim ~~[[3]]~~ 1, wherein the electronics ~~may~~ comprise:
- a gradient amplifier unit;
  - an RF amplifier unit;
  - a system controller; and
  - a magnet monitor unit.
5. (canceled)
6. (original) The magnetic field generator of claim 1, wherein the at least one low fringe field region is less than about 50 gauss.
7. (original) The magnetic field generator of claim 1, wherein the at least one low fringe field region is less than about 10 gauss.
8. (original) The magnetic field generator of claim 1, wherein the at least one low fringe field region is less than about 2.5 gauss.
9. (currently amended) The magnetic field generator of claim ~~[[5]]~~ 1, wherein the at least one low fringe field region comprises a toroidal volume around the housing.
10. (currently amended) The magnetic field generator of claim ~~[[5]]~~ 1, wherein the electronics occupies a toroidal volume around the housing.
11. (original) The magnetic field generator of claim 1, wherein the magnets are superconducting coils.

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12. (currently amended) A magnetic resonance imaging system comprising:  
a plurality of main magnet coils;  
a plurality of shielding coils located radially outward from the plurality of main magnet coils;  
a housing that houses the main magnet coils and the shielding coils;  
electronics for operating the magnetic resonance imaging system, the electronics located radially outward of the housing and proximal to the housing; and  
wherein the main magnet coils and shielding coils are configured such that they shape a magnetic field to comprise at least one low fringe field region when in operation;  
and  
wherein the electronics are located within the at least one low fringe field region.

13. (canceled)

14. (currently amended) The magnetic resonance imaging system of claim [[13]] 12, wherein the electronics comprise:  
a gradient amplifier unit;  
an RF amplifier;  
a system controller; and  
a magnet monitor.

15. (original) The magnetic resonance imaging system of claim 12, wherein the at least one low fringe field region is less than about 50 gauss.

16. (original) The magnetic resonance imaging system of claim 12, wherein the at least one low fringe field region is less than about 10 gauss.

17. (original) The magnetic resonance imaging system of claim 12, wherein the at least one low fringe field region is less than about 2.5 gauss.

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18. (original) The magnetic resonance imaging system of claim 12, wherein at least one low fringe field region comprises a toroidal volume around the housing.

19. (original) The magnetic resonance imaging system of claim 12, wherein the electronics occupies a toroidal volume around the housing.

20. (original) The magnetic resonance imaging system of claim 12, wherein the magnets are superconducting coils.

21. (currently amended) A method for designing an MRI system that produces a low fringe field region, the MRI system having a magnetic field generator operable via electronics, the method comprising:

- defining a solution space;
- defining a field of view, a center field and homogeneity requirements;
- defining fringe field requirements such that the low fringe field region is produced at a distance less than 2.5 meters radially from the center of the field of view and has a magnetic field strength that is low enough so as to not harm the electronics; and
- running an optimization algorithm to determine coil positions such that the low fringe field region, wherein the electronics may be located without being harmed, is proximal an outer surface of the magnetic field generator.

22. (original) The method of claim 21, further comprising:

- determining whether the coil positions are feasible; and
- determining whether an MRI system with the coil positions is manufacturable.

23. (currently amended) A storage medium encoded with machine-readable computer program code for designing an MRI system that produces a low fringe field region, the MRI system having a magnetic field generator ~~being~~ operable via electronics,

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the storage medium including instructions for causing a computer to implement a method comprising:

defining a solution space;

defining a field of view, a center field and homogeneity requirements;

defining fringe field requirements such that the low fringe field region is produced at a distance less than 2.5 meters radially from the center of the field of view and has a magnetic field strength that is low enough so as to not harm the electronics; and

running an optimization algorithm to determine coil positions such that the low fringe field region, wherein the electronics may be located without being harmed, is proximal an outer surface of the magnetic field generator.

24. (previously presented) The magnetic resonance imaging system of claim 12, wherein:

the electronics are disposed within the at least one low fringe field region; and

the at least one low fringe field region has a magnetic field strength that is low enough so as to not harm the electronics.

25. (new) The magnetic field generator of claim 1, wherein:

the electronics housing is disposed on the magnet housing.

26. (new) The magnetic field generator of claim 1, wherein:

the plurality of main magnet coils and shielding coils are productive of a homogeneous magnetic field that defines an isocenter; and

the at least one low fringe field region and the electronics housing are located in line and radially outboard of the isocenter.